1.0 PURPOSE AND SCOPE

(5.1.1.a, 5.1.1.b, 5.1.1.c, 5.1.2, 5.1.3)

This standard provides requirements for flammable gas entry monitoring to protect facility workers during manned work activities involving locations where flammable gas hazards may exist and for flammable gas monitoring required by flammable gas controls as required by HNF-IP-1266. Additional flammable gas monitoring may be required by Industrial Safety and Hygiene when not required by HNF-IP-1266.

This standard provides requirements and guidance for industrial health technicians who perform flammable gas monitoring.

2.0 IMPLEMENTATION

This standard is effective on the date shown in the header.

3.0 STANDARD

3.1 Manned Work Activity Entry Monitoring

(5.1.2, 5.1.3)

Verify that flammable gas concentrations in locations where a potential flammable gas hazard exists are less than or equal to 25% of the lower flammability limit prior to commencing work. If flammable gas concentrations are greater than 25% of the lower flammability limit, do not start manned work activities.

This requirement shall be applied to manned work activities in tank farms facilities where waste may be present (e.g., tanks, waste transfer-associated structures, waste transfer piping and encasements), associated connected enclosed spaces, inside waste-intruding equipment, and other piping that may have trapped gas due to corrosion to ensure that flammable conditions are not present. Flammable gas hazards may exist in locations because of the steady-state generation and accumulation of flammable gases in the absence of adequate ventilation or because of the retention of flammable gases within the waste and their release in a spontaneous or induced gas release event.

Prior to all entries into subject locations, controls shall be in place to ensure the prevention of ignition sources (e.g., static electricity, friction, spark-producing electrical equipment). This may include bonding, spark-resistant tools, application of anti-static coating, application of coolant, use of classified electrical equipment, and limiting the speed of friction generating equipment.

The following are exceptions to the requirement for flammable gas entry monitoring because other flammable gas controls ensure that no flammable gas hazard exists in these locations.

1. Entry monitoring is not required in double-shell tank headspace.

2. Entry monitoring in single-shell tank headspace is not required.

3. Entry monitoring in double-contained receiver tank 244-S, 244-TX, or 244-BX is not required.

4. Entry monitoring is not required in connected enclosed spaces (e.g., risers, waste transfer-associated structures) of a double-shell tank, single-shell tank, or double-contained receiver tank unless there is uncertainty whether the space is connected to the tank headspace.

    a. Entry monitoring is not required in a riser if a riser is known to be open to the tank headspace.

    b. Entry monitoring is not required in a waste transfer-associated structure if the structure is known to be open to the tank headspace (e.g., there is an open drain or riser between the structure and tank headspace).

    c. If there is uncertainty that the riser is open to the tank headspace (i.e., the riser may extend into the waste and thus be waste-intruding equipment), entry monitoring is required.

5. Entry monitoring in a double-shell tank annulus is not required unless there has been a waste leak or misroute into the annulus.

Where entry monitoring is not conducted, there shall be a one-minute pause in the work activity after opening containment.

Other exceptions to entry monitoring requirements shall be evaluated and approved by Industrial Safety and Hygiene on a case-by-case basis.

3.2 Tank Headspace Monitoring
(5.1.1.c, 5.1.2, 5.1.3)

3.2.1 Actively Ventilated Tanks
(5.1.1.a)

Flammable gas monitoring for actively ventilated tanks shall be performed in the tank headspace by monitoring in one of the following locations:

- At a location at least three feet below the bottom of a riser (may be through a Standard Hydrogen Monitoring System (SHMS) probe or Multi-Functional Instrument Tree (MIT) middle or lower gas sample port)

- In the exhaust ventilation system up to the suction side of the first mixing point for a tank exhausted through a common header

- In the exhaust ventilation system up to the discharge location for a tank that has a dedicated ventilation exhaust system.

3.2.2 Passively Ventilated Tanks
(5.1.1.b)

Flammable gas monitoring for passively ventilated tanks shall be performed by monitoring in one of the following locations:

- The tank headspace at a location at least 3 feet below the bottom of a riser (may be through a SHMS probe or MIT middle or lower gas sample port)

- For passively ventilated tanks with no induced gas release event hazard present, an alternative location may be used provided flammable gas monitoring ensures a representative of the flammable gas concentration in the tank headspace.

  – Inside a sealed riser through a sealed connection such as an Enraf flush port which utilizes quick-disconnect plugs with a positive shutoff valve.

  – At another location as evaluated by Industrial Safety and Hygiene and approved in accordance with Section 3.2.3.

  NOTE: No induced gas release event hazard is present if no flammable gas controls for induced gas release event hazards are required by HNF-IP-1266, Section 5.10, paragraph 3.C.3.

3.2.3 Selection of Other Monitoring Locations

In passively ventilated tanks when no gas release event hazard is present, monitoring locations for flammable gas monitoring other than in the tank headspace may be used if an evaluation is performed that ensures the flammable gas measurement is representative of the tank headspace flammable gas concentration. The evaluation shall consider the following:

- The monitoring location shall be sealed to ensure that the flammable gas concentration in the monitored location is not diluted by in flowing air

- Physical connection of the flammable gas monitor shall not dilute the flammable gas concentration in the monitored location. If connecting the flammable gas monitor dilutes the flammable gas concentration in the location to be monitored, monitoring may be allowed if (1) the location is purged to replace the diluted air with air drawn from the tank headspace or (2) the flammable gas concentration measurement is delayed by the time required for diffusion to return the flammable gas concentration in the location to a concentration that is representative of the tank headspace (see RPP-19013).

4.0 DEFINITIONS

No terms or phrases unique to this standard are used.

NOTE: Waste-intruding equipment is defined in HNF-SD-WM-TSR-006. Manned work activities, tank headspace, and connected enclosed spaces are defined in HNF-IP-1266, Section 5.10.

5.0 SOURCES

5.1 Requirements

1. HNF-SD-WM-TSR-006, "Tank Farms Technical Safety Requirements."
   a. LCO 3.1.1, Transfer Leak Detection Systems.
   b. LCO 3.1.2, Backflow Prevention Systems.
   c. Administrative Control 5.10, Flammable Gas Controls.

2. HNF-IP-1266, "Tank Farms Operations Administrative Controls, Section 5.10, "Flammable Gas Controls."

3. HNF-SD-WM-HSP-002, "Tank Farms Health and Safety Plan."

5.2 References

1. RPP-19013, "Measuring Headspace Flammability Through Tank Risers."